"Reconsideration on Business Cycles in Australia, Compared with the United States and Japan"

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1. Focus of the Study

In my previous paper, I have compared the compound cycle in the United States with those in Mexico and Japan. And I have constructed the four-cycle schema in the case of US, in which construction cycle was added to the three-cycle schema of J.A. Schumpeter.(1) The four-cycle schema of US had the deepest bottoms in 1932 and 1992 with the period of 60 years. It has been running twelve years ahead of the Japanese four-cycle schema and 20 years ahead of the Mexican one. Actually the ratios of gross investment to GDP in US had the deepest bottom in 1991. According to her four-cycle schema, this bottom must be recently the deepest in the compound cycle of US. Compound cycle combines four cycles. The stock cycle in US has the same periodicity as Kitchen cycle. The equipment cycle and construction cycle in US had simultaneously the deepest bottoms in 1933, but

had no periodicity after that, mainly because of the increased government investment during the Second World War, the enlarged foreign investment in the postwar time and the military expense during the Vietnam War. But the equipment cycle in US had the deepest bottom in 1991~93 and the construction cycle had the one in 1993. I have judged the infrastructure cycle in US had the deepest bottom in 1933, in which the equipment cycle and construction cycle had simultaneously the deepest bottoms. As infrastructure cycle has the period of 60 years, I could judge the infrastructure cycle in US had recently the deepest bottom in 1933, in which the equipment cycle and construction cycle had simultaneously the deepest bottoms.[2] The compound cycle of US entered into the long-term revival phase and the ratios of public debt balance to GDP decreased after 1995.[3]

On the other hand, I have estimated the infrastructure cycle in Japan had recently the deepest bottom in 2000. And I observed Information Technology and Ecological Revolution[4] as basic innovations, which would turn infrastructure cycle to the long-term revival phase[5]. The structural reforms through privatization and regionalism must perform effectively as they have done well in the United States.[6] It is also another basic innovation that free trade agreement is reformed to regional integration, in which countries cooperate coping with environmental problems. Therefore I discussed the possibility of the regional integration between South Korea and Japan.[7]

In Japan, these basic innovations have not yet been realized effectively. As the equipment cycle and construction cycle are depressed by the recent structural reforms, the deepest bottom of compound cycle in Japan must be postponed in 2004 according to the Japanese four-cycle schema.[8] Ratios of government debt balance to GDP in Japan are depressed in accordance with the compound cycle, though the government is trying to reduce it.

One of the countries that have been carrying out the structural reforms since the 1980s is Australia, which is far ahead

of Japan in starting the reforms. Australia has implemented the privatization of national enterprises and the nature conservation. She advocated organizing APEC in 1989 to promote the free trade in the Asian and Pacific region. The Australian Labor Party government could start boldly the structural reforms owing to the existence of steady safety net, which had not yet existed in Japan. After the Liberal and National Parties took office in Australia, the principle of market is preferred and the ecological revolution has retreated.(9) I will compare the compound cycle of Australia with those of the United States and Japan, and reconsider the long-term revival phase of the compound cycle in Japan.

2. Compound Cycle indicated by Investment Level and Growth Rates

At first I will examine the ratios of domestic gross investment (gross fixed capital formation + increase in stocks) to GDP of Australia comparing with those of the United States and Japan. See Figure 1. The pattern of gross investment GDP ratios in Australia is running ahead of the one in Japan, and follows the one in the United States. Generally speaking, the pattern of gross investment GDP ratios combines stock cycle, equipment cycle and construction cycle. But at the same time, it combines infrastructure cycle that is caused by equipment investment and construction investment for basic innovations. Therefore, we can hypothesize the ratios of gross investment to GDP will fluctuate combining the four cycles with the same period as that of infrastructure cycle. This is the compound cycle, whose period is assumed as 60 years as I will mention later on, though peaks and bottoms are slightly different from those of infrastructure cycle. Both cycles have the four long-term phases of upswing, downswing, depression and revival during 60 years.(10) According to this hypothesis and seeing Figure 1, we can estimate the compound cycle in Australia started the upswing phase during the 1950s and arrived at the highest

peak in 1965. After that, it turned to the downswing phase with a temporary recovery and entered into the depression phase during the 1980s, arriving at the deepest bottom in 1991 or 1992 as well as in the United States.

Next, I will compare the economic growth rates of Australia with those of US. See Figure 2. They indicate the short-term fluctuation, that is, the growth rates of compound cycle. In the postwar time, the fluctuation of economic growth rates in Australia has become to coincide with that in US. Australia developed the economic relationship with the United States because she allied with US during the Second World War to fight with Japan, and continued the military relationship with US in the postwar time.(11)

As you can see in Figure 1, the compound cycle of Australia started the long-term upswing during the Liberal Party government of R. G. Menzies as prime minister (1949-66). "His strong belief in US as the bulwark of Australian security led to the alliance of Australia, New Zealand and US (ANZUS) in 1951 and to Australia's joining the South East Treaty Organization (SEATO) in 1954."(12) He presided over rapid industrial growth during the 1950s and the early 1960s, sponsoring the development of natural resources and transportation, and encouraging foreign investment and immigration from Europe. During his ministry, Olympiad was held in Melbourne in 1956. After he retired in 1966, the compound cycle of Australia turned to the long-term downswing. The succeeded government of H. Holt as prime minister (1966-67) increased Australian troop support of the US military effort in Vietnam. The next succeeded government of J. G. Gorton as prime minister (1968-71) maintained Australian troops in Vietnam. Therefore, the investment from US increased and the economic growth continued. During the government of W. McMahon as prime minister (1971-72), the investment level dropped down because of dollar depreciation in 1971. The continued coalition of the Liberal and Country Parties conceded the power to the Labor

Party. During the Labor Party government of G. Whitlam as prime minister (1972-75), there was an economic boom owing to the immigration from Asia and Africa, but a recession came in 1975 due to the end of Vietnam War. Then the coalition government of the Liberal and National Country Parties took office again. J. M. Fraser as prime minister (1975-83) attempted to curb inflation by such orthodox measures as trimming government spending and discouraging union demands for large wage increases. Fraser's government was again successful in elections held in 1977 and 1980.[13] "Between 1950 and 1977, Britain's share of Australia's exports was reduced from 39% to only 5%, and the rise of Japan' s share from 4% to 34% during the same period hinted at a direct supplanting."[14] When the debt crisis in Mexico occurred in 1982, the Australian economy with the large external debt also dropped down. Then the Labor Party government took office again in 1983. During the Labor Party government of R. Hawke as prime minister (1983-1991), the market oriented structural reforms through deregulation and privatization were started boldly,[15] when the compound cycle of Australia entered already into the depression phase. "Hawke achieved greater industrial harmony by instituting a unified wage accord among Australia's fractious labor unions. He was also able to lower the rate of inflation."[16] He won elections in 1984 and 1987. In 1989, he advocated APEC and diversified the Australian trade. When the bubble economy in Japan burst out in 1990, the Australian economy also worsened and Hawke's parliamentary majority was considerably reduced in the election of 1990. In 1991 when Australia struggled through a severe recession, Hawke lost in a leadership battle with P. Keating for control of the Labor Party. During the Labor Party government of P. Keating as prime minister (1991-96), he inaugurated financial programs and was reelected in 1993 when the economy regained strength. But his government was defeated by a coalition of the Liberal Party and the National Party in the election of 1996, when the economy dropped down. During the

coalition government of J. W. Howard as prime minister (1996-present), he succeeded the structural reforms of the Labor Party and won the election in 1998 when the economy recovered. In 1999, a referendum was held to determine whether Australia would cut its historic ties to the United Kingdom and become a republic, but failed to carry, vindicating Howard, who had opposed it. Olympiad was held in Sydney in 2000 and Howard won again in the election of 2001.

3. Stock Cycle, Equipment Cycle, Construction Cycle,

I will compare the ratios of stock investment to GDP in Australia with those in US. See Figure 3. The ratios of private stock investment to GDP in US had fluctuated between −4% and 4% since the great depression, but snaked between −0.5% and 2% after the 1950s and 1960s. In Australia, the statistics of national accounts are available after 1948. During the postwar time, the ratios of stock investment to GDP in Australia fluctuated between −4% and 4%, but they snaked between −0.5% and 2%, and have coincided with those in US. In Australia, they have the peaks in 1952, 56, 60, 62, 65, 68, 70, 74, 77, 79, 81, 84, 89, 93, 99. Therefore, the period of the stock cycle is 3.35 years close to 3.33 years, that is, 40 months of Kitchin cycle.

We can compare the equipment cycles in Australia and US by Figure 4. The ratios of equipment investment to GDP in Australia are obtained after 1962 by the statistics of OECD. We are not able to recognize a cycle in them, but able to see the highest peak in 1965 and the deepest bottom in 1991. The equipment cycle in Australia would have 2.5 times of the period between 1965 and 1991, as equipment cycle has usually a period of 10 years. If the highest peak of equipment cycle were the peak of infrastructure cycle, the infrastructure cycle in Australia would have the peak in 1965. The ratios of private equipment investment to GDP in US had the deep bottoms in 1933 and 1943. As I mentioned in my

previous paper, the gross government investment of US in 1943 would include large equipment investment during the Second World War. Therefore, we could estimate the equipment cycle in US had the deepest bottom in 1933, not in 1943.[17] We could not recognize equipment cycle after the Second World War, but we could see the bottoms in 1952, 61, 71, 83, 91, after 1943, which were close to the period of 10 years. The recent burst of the bubble economy in US must be due to the period of equipment cycle after 1991.

We can compare the construction cycles of Australia and US by Figure 5. We could not recognize a cycle in the ratios of construction investment to GDP in Australia, but we could see the highest peak in 1965 and the deepest bottom in 1995. The construction cycle in Australia would have 1.5 times of the period between 1965 and 1995, as construction cycle has usually a period of 20 years. If the highest peak of construction cycle were the peak of infrastructure cycle and the deepest bottom were the bottom of infrastructure cycle, the infrastructure cycle in Australia would have the peak in 1965 and the bottom in 1995. The ratios of construction investment to GDP in US had the deep bottoms in 1933 and 1943. As gross government investment in 1943 would include also large construction investment during the Second World War, we could estimate the construction cycle in US had the deepest bottom in 1933, which would be the bottom of infrastructure cycle in US.[18] After 1933, the construction cycle in US had the deepest bottom in 1993, which must be the recent bottom of infrastructure cycle in US. As construction cycle has usually a period of 20 years, the construction cycle in US would have had the peak in 1943 to the contrary and have had the highest peak in 1963. But we could not see the highest peak during the 1960s because of the increase of overseas investment and the expenditure of Vietnam War.

In Australia, the infrastructure cycle would have the peak in 1965, when the equipment cycle and the construction cycle had simultaneously the highest peak. As infrastructure cycle has

usually a period of 60 years and has 30 years between peak and bottom, the infrastructure cycle in Australia would have the bottom in 1995, when the construction cycle had the deepest bottom.

4. Four-cycle Schema and Compound Cycle in the case of Australia

As I mentioned in the previous papers, I have set up the following hypotheses for standard periods of the four cycles.[19] J. A. Schumpeter discerned one Juglar cycle included three Kitchin cycles and one Kondratieff cycle included six Juglar cycles. Therefore, assuming the standard period of stock cycle were 40 months (= the average period of Kitchen cycle), I have hypothesized the standard period of equipment cycle is 10 years (= 40 months * 3) and that of infrastructure cycle were 60 years (= 10 years * 6) . Adding to the hypotheses of Schumpeter, I have hypothesized one Kondratieff cycle would include three Kuznets cycles and the standard period of construction cycle were 20 years (= 60 years / 3). I have discriminated the variable average periods of Kitchin, Juglar, Kuznets and Kondratieff cycles from the fixed standard periods of the substantial investment cycles. Because I would like to construct the ideal models of stock cycle, equipment cycle, construction cycle and infrastructure cycle with the standard periods. Constructing such an ideal model is signified by 'Idealtypus' (ideal type) in Max Weber's concept for social science.[20]

In the case of Australia, I have also hypothesized that stock cycle, equipment cycle, construction cycle and infrastructure cycle have the standard periods of 40 months, 10 years, 20 years and 60 years respectively. Following J.A. Schumpeter, I have assumed the amplitudes of cycles were in proportion to the periods of cycles, which were 3.33 : 10 : 20 : 60 = 0.333 : 1 : 2 : 6. The four-cycle schema is combined by the sine curves of the standard periods and

amplitudes. The proportion is expressed on the base of the amplitude of equipment cycle because the proportion of the amplitudes in the improved three-cycle schema without stock cycle was assumed to be 10 : 20 : 60 = 1 : 2 : 6 in the previous papers. I have adopted the following formulas for the sine curves.

Infrastructure cycle = 6 sin (360 n / 60)

Equipment cycle = 1 sin (360 (n + 7) / 10)

Construction cycle = 2 sin (360 (n + 10) / 20)

Stock cycle = 0.333 sin (360 (n + 5) / 3.33)

The (n) in the formulas indicates the number of years passed from the starting point, which is assumed to be the year of 1950. We can reckon the starting point because the highest peak of infrastructure cycle in Australia would be in 1965 when equipment cycle and construction cycle had the highest peaks coincidentally. In 1950, R. G. Menzies, who took office in the previous year, started the economic growth policy sponsoring the development of natural resources through the introduction of foreign investment. We have judged the infrastructure cycle had the peak in 1965, in the next year of which Menzies retired. The longest continuous ministry of Menzies was in the long-term upswing phase. As ratios of equipment investment to GDP in Australia had the highest peak in 1965, the standard peaks of equipment cycle would coincide with the actual peaks through adjusting (n) to (n + 7). As the ratios of construction investment to GDP had the highest peak in 1965, the standard peaks of construction cycle would coincide with the actual peaks through adjusting (n) to (n + 10). As ratios of stock investment to GDP had the deepest bottom in 1991, the standard bottoms of stock cycle would coincide with the actual bottoms through adjusting (n) to (n + 5).

The four-cycle schema is inevitably detached from the actual values, because it is Idealtypus. But it would be meaningful to compare the actual values with the standard values, which could be the measure of the compound cycle in Australia. In Figure 6, I have compared the four-cycle schema of Australia with the actual

values of gross investment GDP ratios in Australia shown already in Figure 1. The four-cycle schema in Figure 6 is adjusted through the proportion of the actual and standard values, and the average value of the gross investment GDP ratios. The proportion of the actual and standard values is 0.76, which is the ratio of (max. − min. of actual values) to (max. − min. of standard values). The average value of the actual values is 25.0%. By this adjustment, the four-cycle schema is folded on the actual ratios of gross investment to GDP. According to this adjustment method, the actual values were lower than the standard values during the 1950s, 1960s and 1970s. But, during the 1980s and 1990s, the actual values were higher than the standard values, which would have been caused by the increased investment from abroad. The peak in 1989 must be in the bubble economy. The compound cycle had the deepest bottom in 1991-92, but after that, capital inflows recovered.

The four-cycle schema is an ideal type combined by the sine curves of standard periods. The actual values of gross investment GDP ratios are coinciding with the adjusted pattern of the ideal type, which would indicate the standard values of gross investment GDP ratios. They would mean the level of business cycles. According to the adjusted pattern in Figure 6, the actual values of gross investment GDP ratios in Australia would show 20-30% of GDP, while the standard values also would show 20-30%. Investment level would be largely influenced by the trade conditions, and the fiscal and financial policies. Therefore, the separation of the actual values from the standard values is unavoidable. However, we could estimate the compound cycle of Australia would have passed the deepest bottom during the Labor Party government of P. Keating as prime minister (1991-96), because the deepest bottom of the four-cycle schema in Australia was in 1991-94. Therefore, the compound cycle during the Liberal and National coalition government of J. W. Howard as prime minister (1996-present) must be already in the long-term revival

phase.

5. Four-cycle schema and Economic Growth Rates

The four-cycle schema in Figure 6 indicates the standard amplitude of compound cycle, which signifies the investment level cycle. Adding to the three-cycle schema, Schumpeter indicated the schema of its differential rates, which signified the standard amplitude of the growth rate cycle. Economic growth rates do not always coincide with stock cycle. They should indicate the growth rates of compound cycle and coincide with the real feeling of the people about business cycles. Therefore, it would be significant to compare economic growth rates with the differential rates of the four-cycle schema as well as to compare gross investment GDP ratios with the four-cycle schema.

In Figure 7, the real economic growth rates in Australia are compared with the differential rates of her four-cycle schema. However, the curve of the differential rates of the four-cycle schema is adjusted by the formula (the differential rates * 3.35 + 3.92), in order to be compared with the economic growth rates directly. I have multiplied the differential rate against the previous year of the four-cycle schema by 3.35, which equals to (max. − min. of actual values) / (max. − min. of standard values). Thereafter, the average of the actual values of economic growth rates, that is, 3.92% is added to the multiplied differential rates.

The economic growth rates in Australia almost stayed within the pattern of standard amplitudes after the 1950s, though they were not obtained before the Second World War. When the actual values dropped into minus in 1953, 1961, 1982 and 1991, the standard amplitudes sometimes showed the peaks to the contrary. Although the peaks of the actual values did not necessarily coincide with those of the standard values, the recovery of them during the 1990s is alongside with the revival phase of the differential rates of the four-cycle schema in Australia.

6. Government Debt Balance and Compound Cycle

The four-cycle schema is the ground for the forecast of the investment level and economic growth rates in Australia. But we have seen the balance of government debt could be the factor to let compound cycle descend or decline in the cases of US, Germany and Japan. Therefore, I would like to examine the relations between compound cycle and government debt balance in the case of Australia, compared with those of the United States, and Japan.

In Figure 8, the ratios of government debt balance to GDP are compared among Australia, US, and Japan. The balance of government debt in Australia was 96.6 billions of Australian dollars at the end of 1999, which was 63.1 billions of US dollars, and 15.8% of GDP. This includes only the federal government debt. Ratios of government debt balance to GDP in Australia were deteriorated by the increase of wartime debt and reached to 139. 1% in 1949. During the R. G. Menzies government (1949-66), they improved through the foreign capital inflows and the economic integration with US through the participation in ANZUS and SEATO. During the OPEC oil crises in the 1970s, Australia earned money by the exports of coal, wheat, wool, etc. The ratios of government debt balance to GDP had recovered to 20% in 1983 and 12.9% in 1991. They were temporally deteriorated by the depression in 1992, but after that, they recovered again after 1996. This coincides with the deepest bottom of the four-cycle schema between 1991 and 1994. Although government debt balance GDP ratios improved obviously, the external debt balance is increasing, which is 294.5 billions of Australian dollars in the 3rd quarter of 2000 (171.4 billions of US dollars) and largely 45.6% of GDP. This is the problem of the structural reforms in Australia.

The balance of government debt in the United States was 3, 413.2 billions of US dollars at the end of 2000, which was

equivalent to 34.2% of GDP. The public debt balance in US that includes not only the federal government debt, but also the state and local government debt, is 5,674.1 billions of US dollars at the end of Sep. 2000. Ratios of public debt balance to GDP in US increased extremely during the Second World War, but they decreased continuously in spite of the prolonged cold war during the postwar time. If Vietnam War did not happen, they could recover to the prewar level even earlier. The government debt balance GDP ratios took the same tendency as the public debt balance GDP ratios. But they could not recover even more after the oil crises during the 1970s. They increased again when the Reagan administration (1981~89) increased military expenditures and reduced taxes. They continued to increase during the Bush presidency (1989~93), though the cold war ended in 1991 and the compound cycle came to the deepest bottom. They reached 52.8% in 1992 and recovered after that. The public debt balance GDP ratios also stagnated after the Clinton Presidency (1993~2001) started in 1993. They entered into the revival phase after they registered 67.2% in 1995. The four-cycle schema in US had the deepest bottom in 1992 and the compound cycle passed the deepest bottom. As the gross investment GDP ratios have recovered and the government debt balance GDP ratios have improved, the compound cycle of US is already in the long-term revival phase. However, the external debt balance of US is 1,474.6 billions of US dollars and 15.8% of GDP, which is increasing recently.

The balance of government debt in Japan was 522 trillions of yen at the end of Dec. 2000 (4,543.9 billions of US dollars), which was larger than that of US. And it reached 106.5% of GDP that was the level in 1950 of Australia, when her infrastructure cycle started the upswing phase. But the ratio of government debt balance to GDP in Japan in 1944 was higher than the highest level of Australia in 1949. As the deepest bottoms of the four-cycle schema in Japan were in 1944 and 2004, the Japanese deepest bottom of government debt balance GDP ratios in 1944 coincided

with the deepest bottom of the four-cycle schema.[21] The deepest bottom of government debt balance GDP ratios in US coincided with the deepest bottom of the four-cycle schema in 1992. And also the deepest bottom of government debt balance GDP ratios in Australia coincided with the deepest bottom of the four-cycle schema during 1991-1994. Therefore, the ratios of government debt balance to GDP in Japan would reach the deepest bottom in 2004 and enter into the long-term revival phase 12 years later than those in US and 10-13 years later than those in Australia.

7. Conclusion

The communication service industry in Australia is growing at more than 10% annually and information technology is prevailing there.[22] The investment on information technology in Japan is increasing among the equipment investment in every industry.[23] The burst of IT bubble in US at the end of 2000 means the rising equipment cycle recurred to the standard cycle, which ought to have the bottom in 2001. But, as her infrastructure cycle is in the revival phase, the information technology investment is high at 45-46% among the equipment investment in US.[24]

The expenditures for pollution abatement and control on air, water, solid waste, nature care etc. in US were 121.8 billions of US dollars in 1994, which were 1.73% of GDP. They were paid by enterprises (65%), governments (25%) and individuals (10%), and increased rapidly by 7.3% in real term against the previous year.[25] The expenditures for pollution abatement and control in Japan were 11,520 billions of yen in 1995, which were 112 billions of US dollars and 2.38% of GDP and increased by 45% to 1990.[26] These indicate the development of ecological revolution. In the case of Australia, the expenditures for pollution abatement and control were 8.63 billions of Australian dollars in 1996-97 and 1.60% of GDP (6.75 billions of US dollars), which were lower than those in Japan and US. This is mainly because the expenditure for

the construction of water facility is not included.[27] By the way, these expenditures in Germany that is the most environmentally advanced country were 69.8 billions of US dollars in 1995 and 2. 92% of GDP.[28] This is the consequence of the strict environmental law. If there were no innovations of such social systems, basic innovations like ecological revolution could not be invested rapidly.

Business cycles in Australia have introduced basic innovations from UK in the prewar time and from US in the postwar time. Information technology and ecological revolution are recently introduced, but the safety net like actual prohibition of mandatory retirement and continuous security for unemployment was introduced much earlier.[29] Therefore, the Labor Party government in Australia could start boldly the structural reforms during the 1980s through deregulation and privatization and lower the ratios of government debt balance to GDP. The steady safety net like in Australia has not yet existed domestically in Japan. It is necessary for Japan to introduce the safety net as a basic innovation, which would be the necessary condition to turn her compound cycle to the revival phase. In UK and Germany, not only safety net, but also springboard and trampoline are introduced, which emphasize job training and social comeback. Employment insurance, old age pension, health insurance, living security, vocational education, vocational training, employment exchange, work sharing etc. should be linked as an infrastructure of social system.[30] Such an infrastructure investment will help to turn the compound cycle of Japan into the long-term revival phase.

End (December 19, 2001)

Note

(1) Osamu Ozeki "Reconsideration on Business Cycles in the United States, Compared with Mexico and Japan" The Journal of Yokohama College of Commerce, Vol.34, No.2, December 2000, p.118. Compound cycle is combined by stock cycle, equipment cycle, construction cycle and infrastructure cycle. It has the same period

as infrastructure cycle, which has the longest period, that is, 60 years.

(2) See, Figure 4 and Figure 5.

(3) Ratios of public debt balance to GDP in US have recovered since 1994, when Daniel Beard, president of land development bureau declared to stop to construct dams. 460 dams were removed during 1994-2000. See, Reiko Amano, "Dam and Japan," 2001, Iwanami-library, p.119

(4) Osamu Ozeki, "Reconsideration on Present Phases of Business Cycles, Comparing Mexico, South Korea and Japan," The Journal of Yokohama College of Commerce, Vol.32, No.2, March 1999, p.141 As I had judged the infrastructure cycle in Japan had the highest peak in 1970, I have estimated it would have the deepest bottom in 2000. I have expressed Ecological Industrial Revolution must be basic innovations, but I would like to call Ecological Revolution because it includes not only the reform of industries, but also the recovery of nature. Declaration stopping to construct dams could not be called "Ecological Industrial Revolution".

(5) Gerald Mensch, "Stalemate in Technology," 1979, Ballinger Publishing Company, pp.47-50. The innovations that cause Kondratieff cycle are called basic innovations in his book. Basic innovations change infrastructure and cause infrastructure cycle.

(6) Basic innovations include new social systems through privatization and regionalism. Regionalism means regions include the relation between man and nature, especially rivers. Declarations stopping to construct dams in US and Japan were caused not only by financial matters, but also by regionalism. See, Hideo Takei, "Homage to Declaration stopping to construct dams," 2001, Kawabe Shorin, p.58.

(7) Op. cit. Osamu Ozeki "Reconsideration on Business Cycles in the United States, Compared with Mexico and Japan," p.118, I have mentioned as follows here. The top meeting between North and South Korea was realized in Korea. It will be necessary for Japan to stop the cold war with North Korea and to construct the northern Asian regional integration cooperating in dealing with natural resources and environment problems, in order to turn her compound cycle to the long-term revival phase.

(8) Op. cit. Osamu Ozeki, "Reconsideration on Present Phases of Business Cycles, Comparing Mexico, South Korea and Japan," 1999, p.154, Here I have examined the four-cycle schema in the case of Japan.

(9) Australia took a conservative position as well as Japan in the international conferences to stop global warming at Hague of

Netherlands in Nov. 2000 and at Bonn of Germany in Jul. 2001. See, Osamu Ozeki, "Comments on COP6" Joint Conference of Six Universities in Yokohama in Dec. 2000. Shunichi Hiraoka, "Reports on COP6 at Bonn of Germany," Jul. 2001, <*http : //www.jca.ax.apc.org/~kikonet/COP6bis taizaiki/bisframe.html*>

(10) Op. cit. Osamu Ozeki "Reconsideration on Business Cycles in Germany, Compared with South Korea and Japan," p.120, Upswing, Downswing, Depression, Revival are corresponding to the diagram of Schumpeter and Kuznets, that is, Prosperity, Recession, Depression, Revival. See, Gerald Mensch, "Stalemate in Technology," 1979, pp.39 -40.

(11) Encyclopedia Britannica Online (Accessed 18 Feb. 2001) "Curtin, John" <*http : //www.eb.com : 180/bol/topic?idxref=475427*>

(12) Encyclopedia Britannica Online (Accessed 18 Feb. 2001) "Menzies, Sir Robert Gordon" <*http : //www.eb.com : 180/bol/topic?idxref=475426*>

(13) Encyclopedia Britannica Online (Accessed 18 Feb. 2001) "Fraser, John Malcom" <*http : //www.eb.com : 180/bol/topic?idxref=475460*>

(14) Encyclopedia Britannica Online (Accessed 18 Feb. 2001) "Australia, Trade" <*http : //www.eb.com : 180/bol/topic?eu=119617&sctn=11*>

(15) Ken Mori, "Miracle in Australian economy," Feb. 2000, Seminar held in the Australian Library in Tokyo <*http : //www.library.Australia.or.jp/salon seminar/02162000/*>

(16) Encyclopedia Britannica Online (Accessed 18 Feb. 2001) "Hawke, Robert" <*http : //www.eb.com : 180/bol/topic?idxref=475462*>

(17) Op. cit. Osamu Ozeki, "Reconsideration on Business Cycles in the United States, Compared with Mexico and Japan," p.122.

(18) Op. cit. Osamu Ozeki, "Reconsideration on Business Cycles in the United States, Compared with Mexico and Japan," p.122.

(19) Op. cit. Osamu Ozeki, "Reconsideration on Present Phases of Business Cycles, Comparing Mexico, South Korea and Japan", p.154.

(20) There was a dispute between Max Weber and Schumpeter about Idealtypus, but they agreed it was a tool of thought. See Yuichi Shionoya, "The Schumpeterian way of thinking," 1995, Yuhikaku, p. 260.

(21) Op. cit. Osamu Ozeki, "Reconsideration on Present Phases of Business Cycles, Comparing Mexico, South Korea and Japan" p.168.

(22) Australian National accounts ; National Income, Expenditure and Products <*http : //www.abs.gov.au/ausstats/abs%40.nsf/e8ae5488b598839cca25682000131612 / d9e260ba2c2fd425ca2568b7001b459a!OpenDocument*>

(23) Homepage of Cabinet Office, "The weekly indicator" (Feb. 5, 2001) No.231 <*http : //www5.cao.go.jp/keizai3/shihyo/2001/0205/231.html*>

(24) Bea News Release "Gross Domestic Product, First Quarter 2001(advance)", Table 3A <*http : //www.bea.doc.gov/bea/newsrel/gdp201a.htm*>

(25) Christine R. Vogan "Pollution Abatement and Control Expenditure 1972-94" Survey of Current Business, September 1996 <*http : //www.bea.doc.gov/bea/an/0996eed/maintext.html*>

(26) Economic Research Institute of Economic Planning Agency, "The estimation of the expenditures for pollution abatement and control in Japan" June 1999 <*http : //www.epa.go.jp/99/g/1999061kankyou-hogo/menu.hyml*> Economic Research Institute "The second estimation of the expenditures for pollution abatement and control and the account of solid waste in Japan," June 2000 <*http : //www5.cao.go.jp/2000/g/0620g-kankyou/0620g-kankyou.html*>

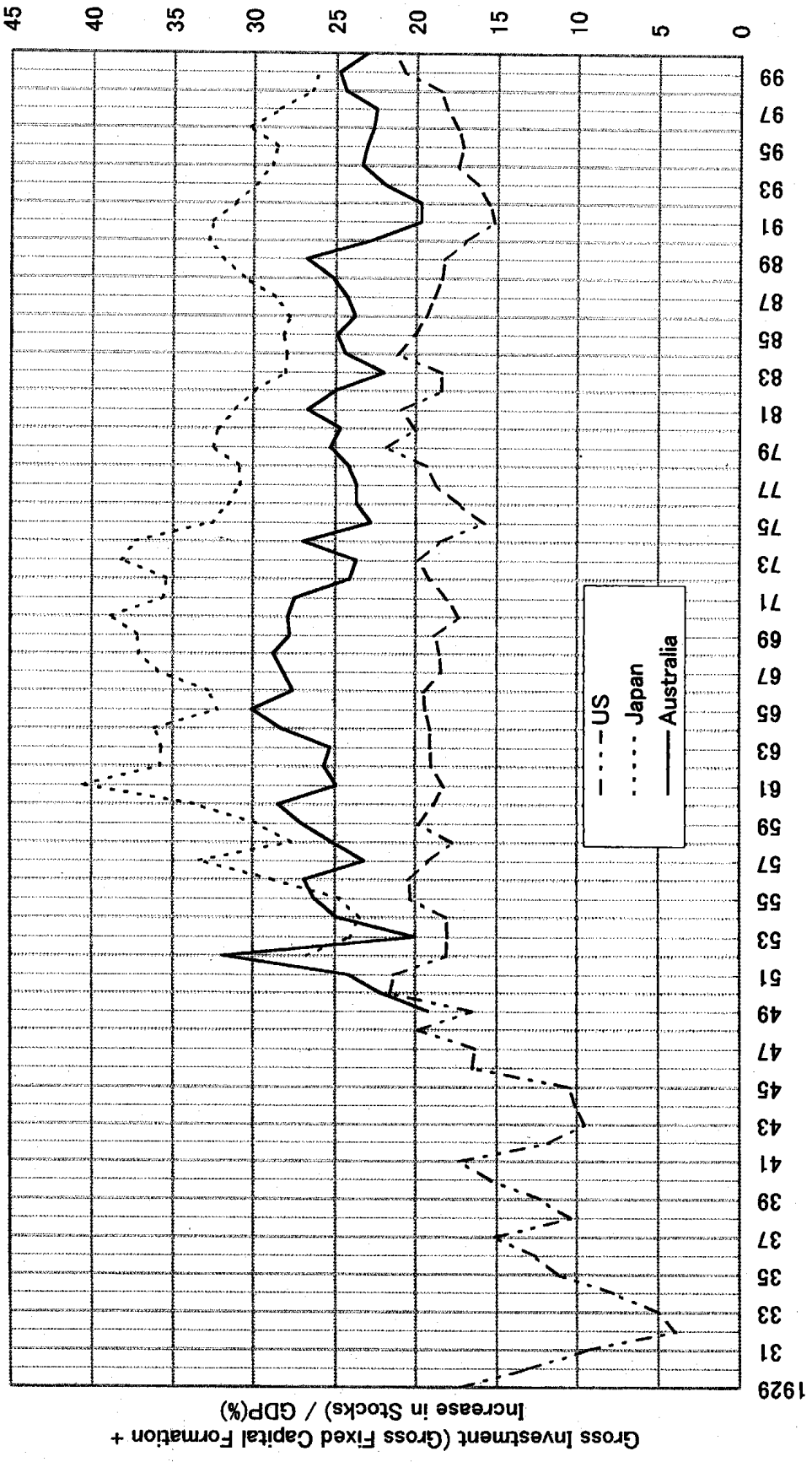
(27) National environmental protection expenditure, Australia <*http : //www.abs.gov.au / ausstats / abs%40.nsf / b06660592430724 fca2568b5007b8619/96f0eae6e19dab4aca2568a9001393fb!OpenDocument*>

(28) Op. cit. Economic Research Institute of Economic Planning Agency, "The second estimation of the expenditures for pollution abatement and control and the account of solid waste in Japan" June 2000

(29) Yoshihide Hosaka, "Reform the social systems before restructuring," Feb. 2001 <*http : //www.smn.co.jp/tks-j/opinions/0202o01j.html*>

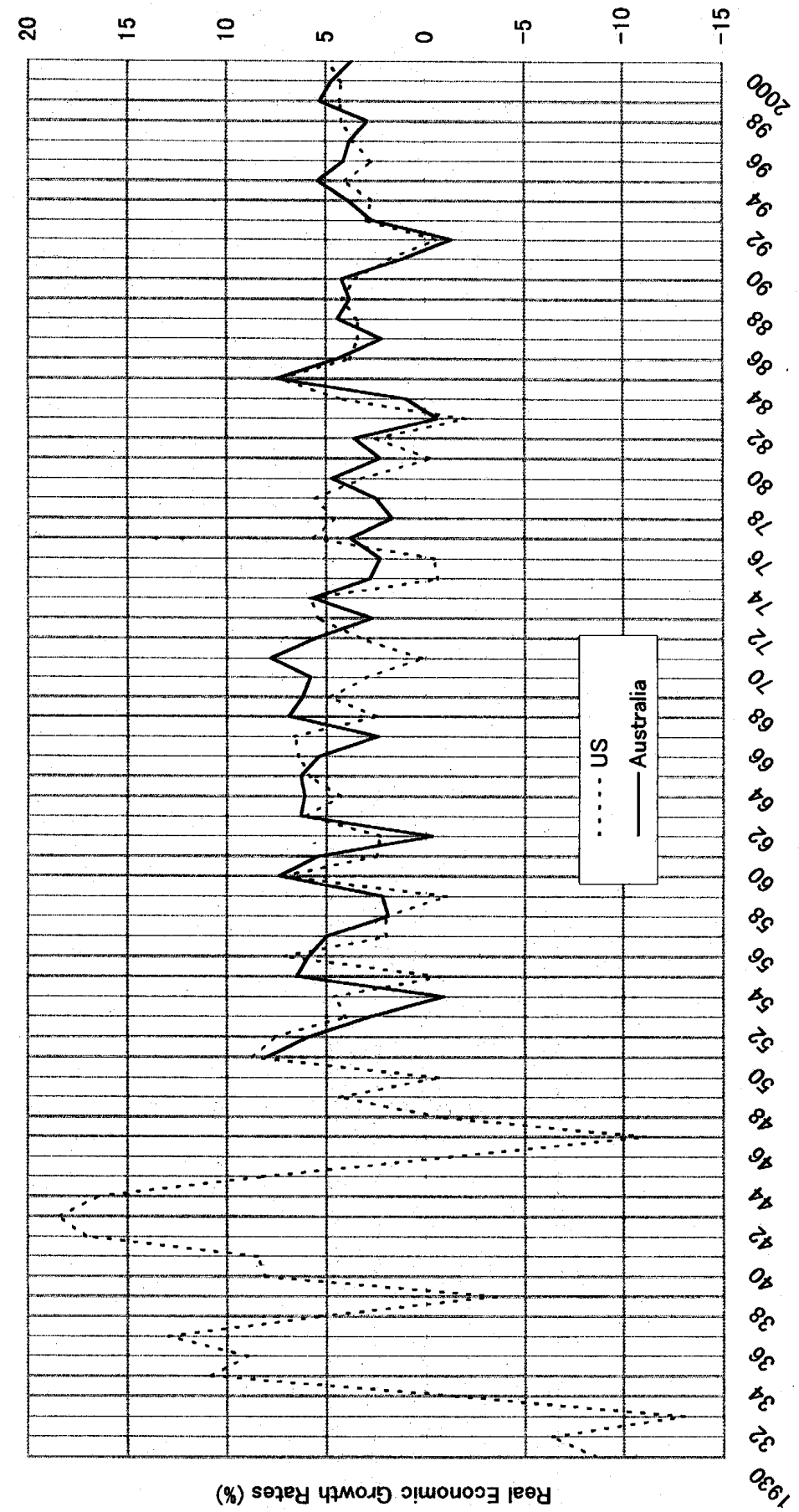
(30) See, Susumu Takashima, "The total view and perspective on the social welfare in Japan," Japan Welfare University <*http : //www.jfast1.net/~sosyaken/kenkyukoryu6/0.PDF*> The low level of safety net in Japan has the historical background. Safety net, Springboard and Trampoline are aiming at the effective use of human resources, which need the turnover of value system about education, that is, the greatest resources. See, E. F. Schumacher, "Small is Beautiful," 1973, Harper & Row Publishers, p.83.

Figure 1. Compound Cycle in Australia, Compared with US and Japan



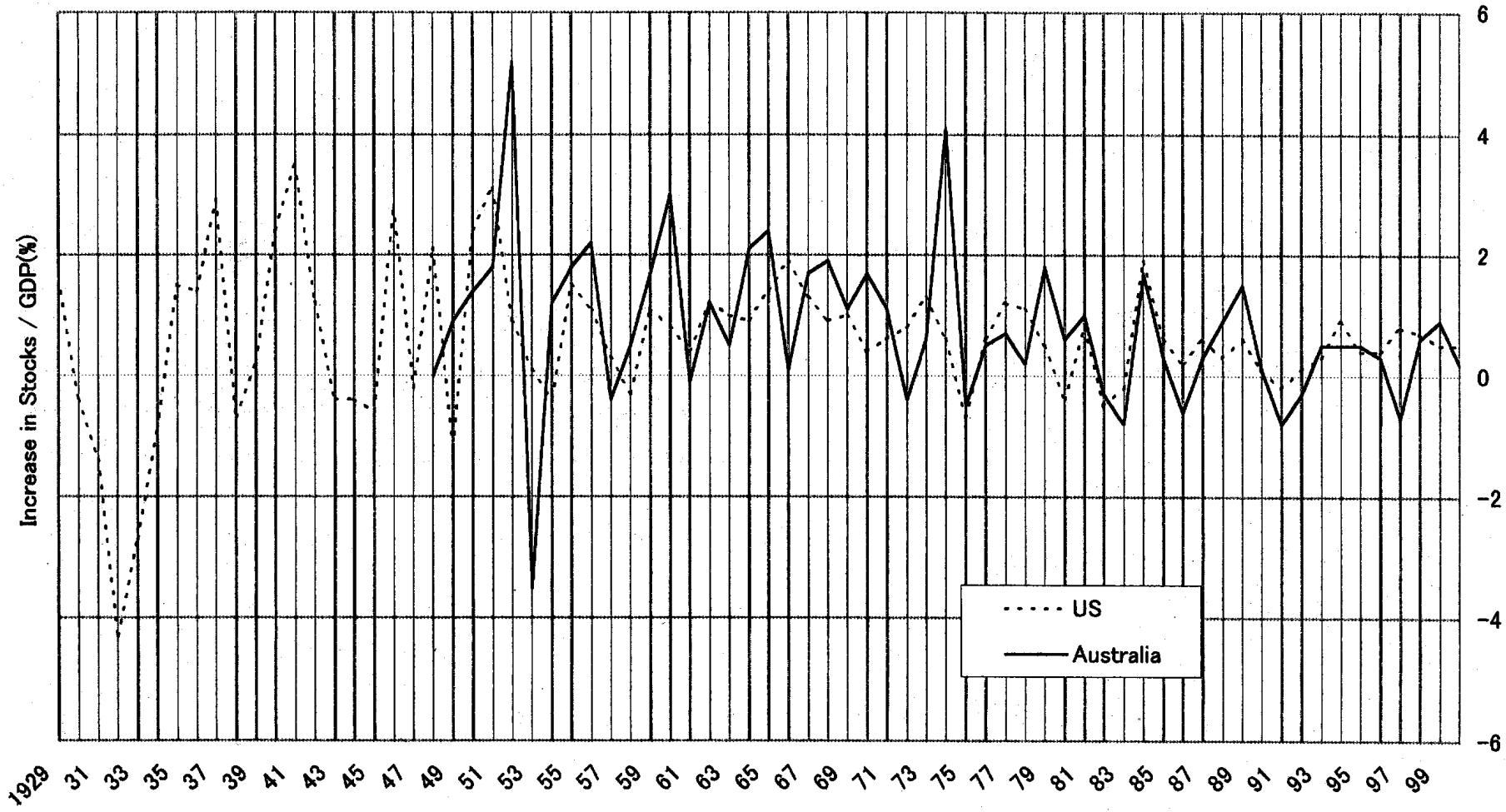
Source : International Financial Statistics, Survey of Current Business

Figure 2. Economic Growth Rates in Australia, Compared with US



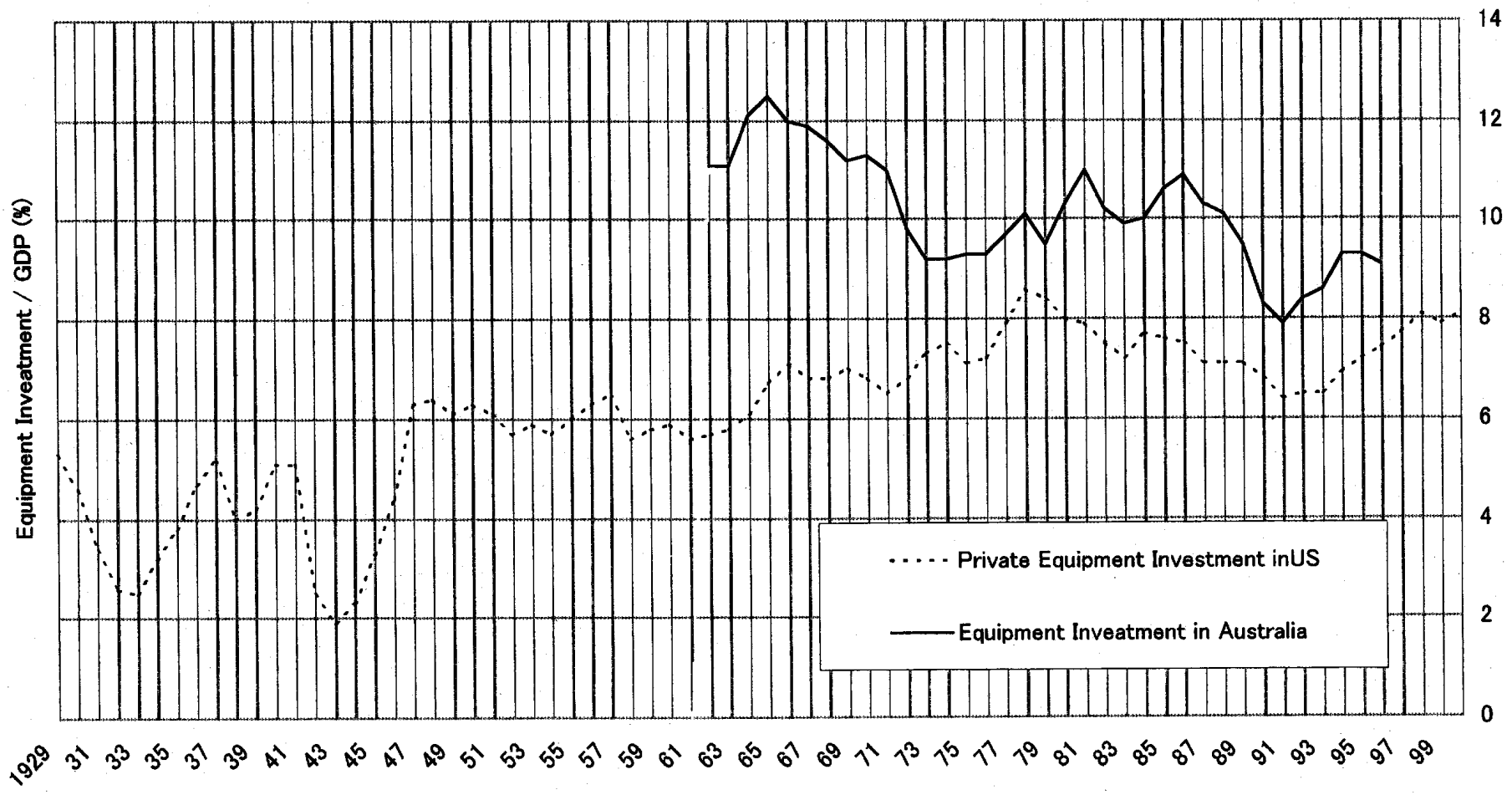
Source : International Financial Statistics, Survey of Current Business

Figure 3. Stock Cycle in Australia, Compared with US



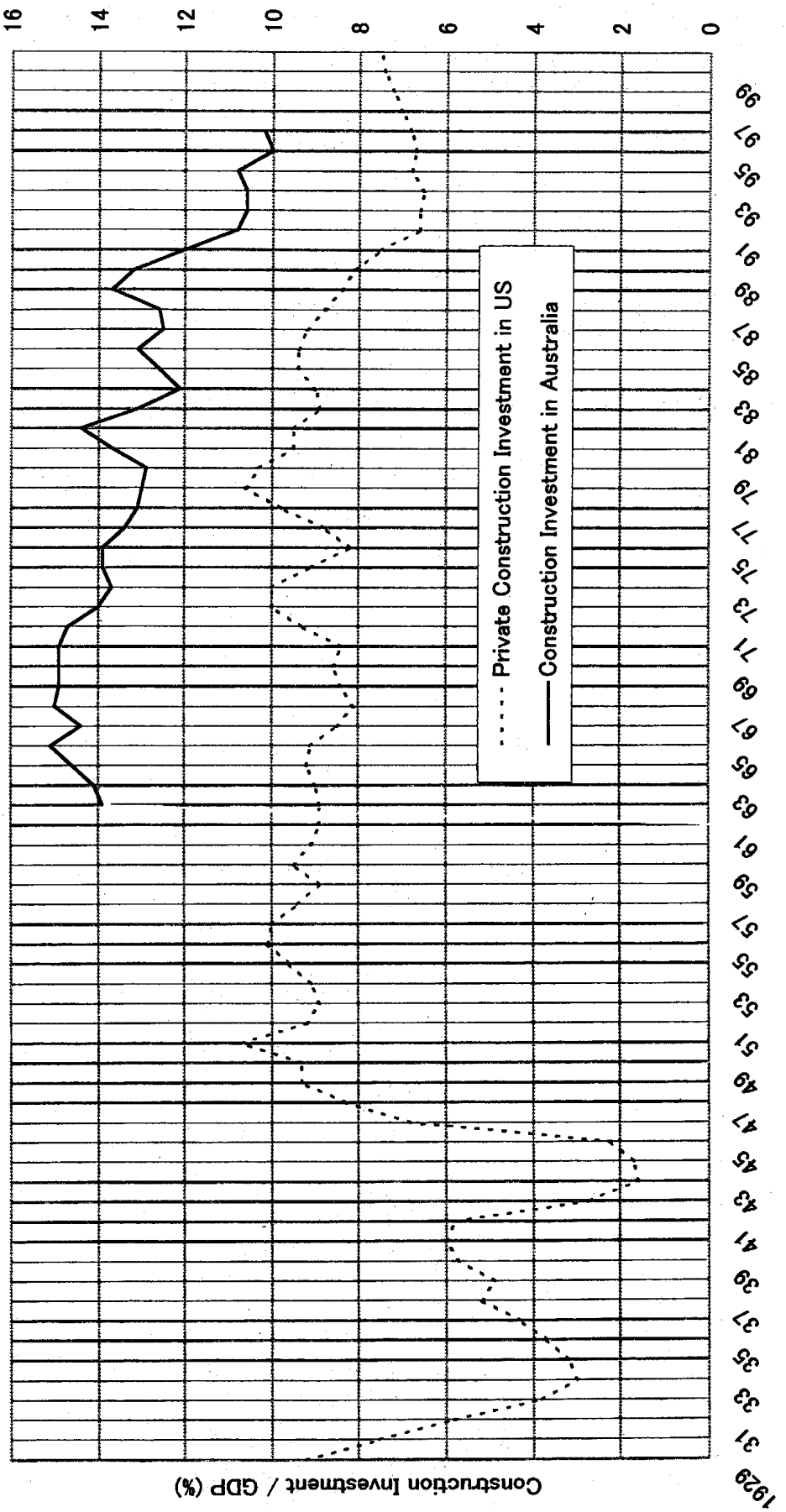
Source : International Financial Statistics, Survey of Current Business

Figure 4. Equipment Cycle, Compared with US



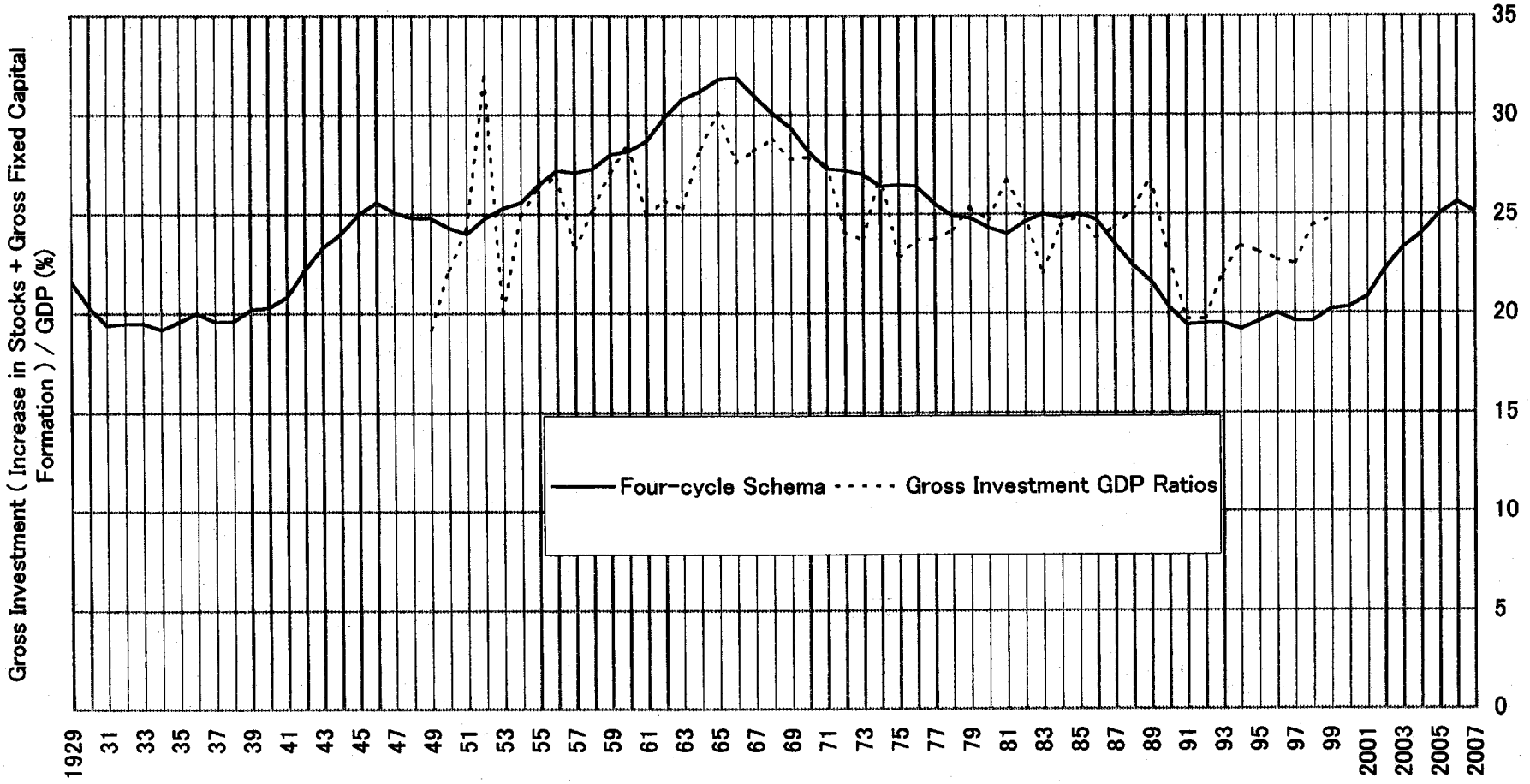
Source : Survey of Current Business, OECD "National Accounts"

Figure 5. Construction Cycle in Australia, Compared with US



Source : Survey of Current Business, OECD "National Accounts"

Figure 6. Four-cycle Schema and Compound Cycle in the case of Australia

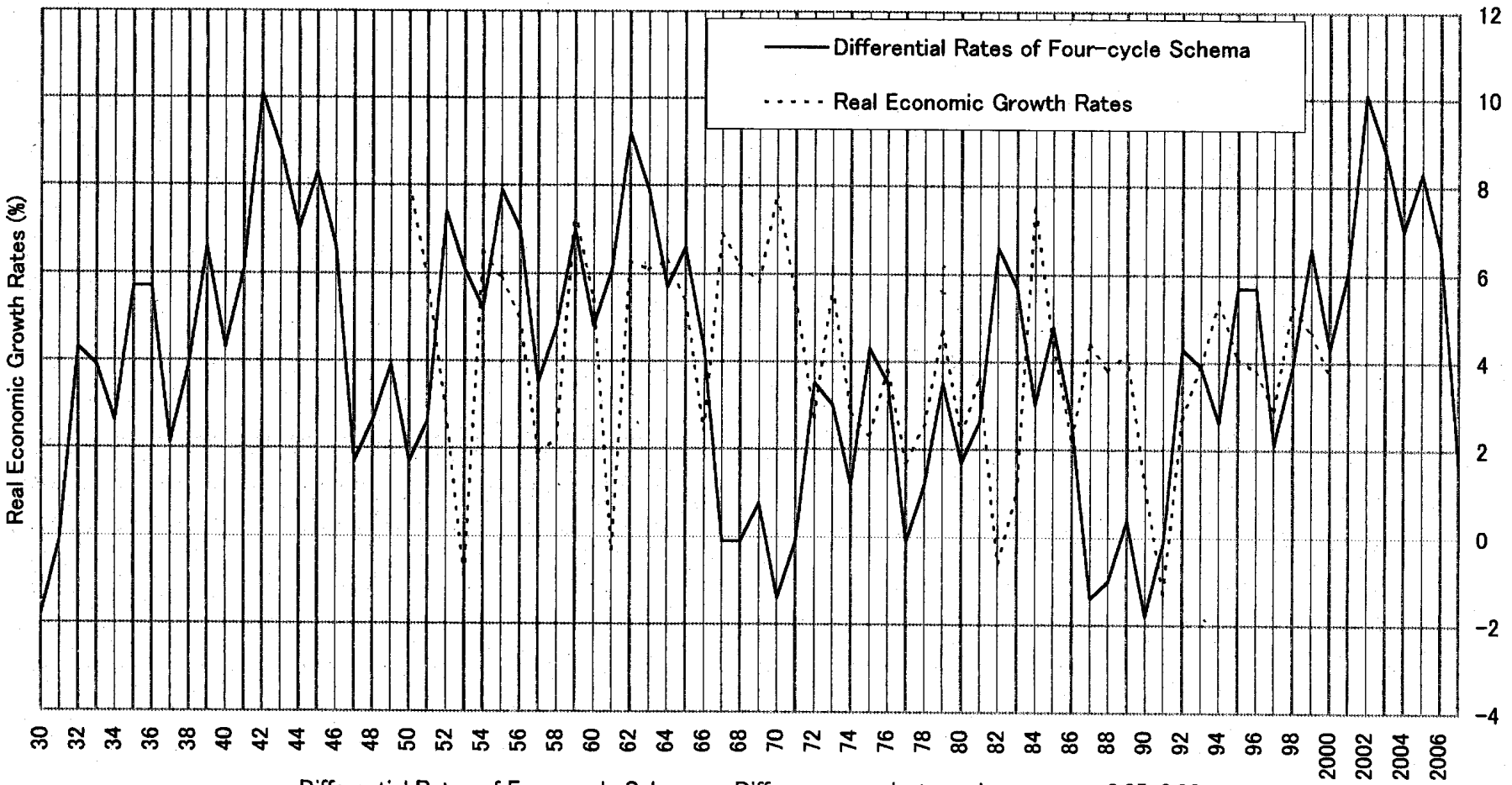


Four-cycle Schema = (6sin(360n/60)+2sin(360(n+10)/20)+1sin(360(n+7)/10)+0.333sin(360(n+5)/3.33))*0.76+25.0

Note : 0.76 = (max.- min. of actual values) / (max. - min. of standard values)

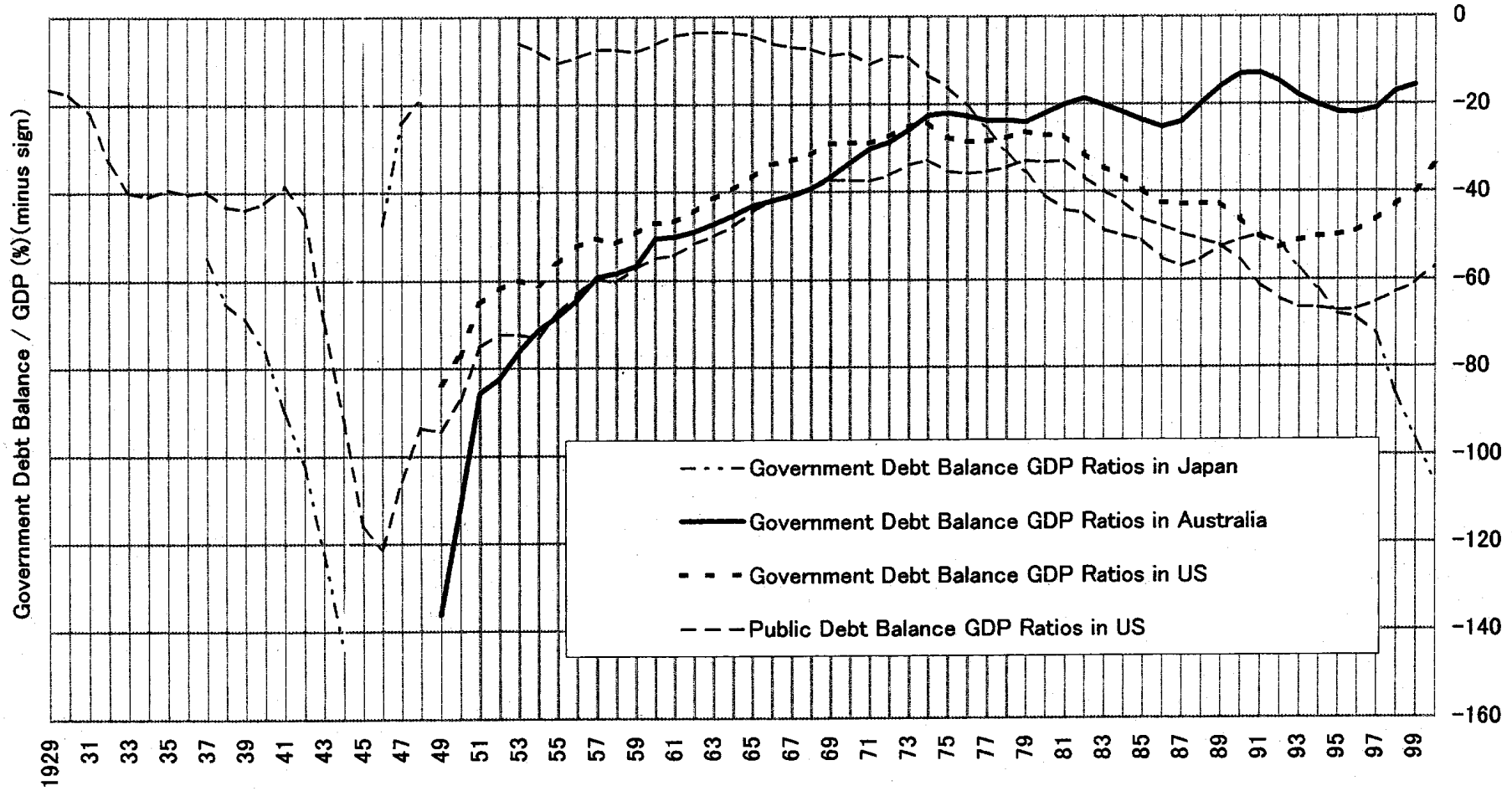
25.0 = the average of actual values, (n) = years passed from 1950

Figure 7. Four-cycle Schema and Economic Growth Rates in the case of Australia



Differential Rates of Four-cycle Schema =Differences against previous years * 3.35+3.92
Note : 3.35 = (max. - min. of actual values) / (max. - min. of standard values)
3.92 = the average of actual values

Figure 8. Government Debt Balance in Australia, Compared with US and Japan



Source : International Financial Statistics, Bureau of the Public Debt Online